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| 10/524,692 | 10/17/2006 | Seiichi Okuda | KUD-002 | 1034 |

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KANESAKA BERNER AND PARTNERS LLP
1700 DIAGONAL RD
SUITE 310
ALEXANDRIA, VA 22314-2848

| EXAMINER | |
|---|---|
| MCLAREN, STEPHANIE D | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3744 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/524,692 | OKUDA ET AL. | |
| | Examiner | Art Unit | |
| | STEPHANIE MCLAREN | 3744 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-6 and 8-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6 and 8-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. This office action is issued in response to the amendment received 12/30/08

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2, 3, 4, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuda (JP 2003-302116, machine translation) in view of La Fleur (3,355,903).

With regards to claim 3, Okuda discloses: An air refrigerant type freezing and heating apparatus comprising: a compressing mechanism (22) which compresses an air refrigerant; a heating unit (23) which heats a first object (warm room, 11) by said air refrigerant outputted from said compressing mechanism; a heat exchanger (24) which cools said air refrigerant outputted from said heating unit; a turbine (25) which expands said air refrigerant outputted from said heat exchanger; and a cooler (cold formation means, pg. 3, paragraph 7, line 2-3) which cools a second object (cold room, 12) different from said first object by said air refrigerant outputted from said turbine.

Okuda fails to disclose: a heat recovery unit which recovers heat of said air refrigerant outputted from said heating unit and heats said air refrigerant flowing between said compressing mechanism and said heating unit. The general concept of

recovering heat from a process to heat up an incoming stream falls within the realm of common knowledge as an obvious mechanical expedient, and is well known in the art as illustrated by La Fleur, which discloses recovering heat from a cycle to increase the heat of steam entering a turbine (hot regenerator 42).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda to include a heat recovery unit to artificially raise the temperature of the warm room by recycling heat, because it improves the process by recovering a portion of the energy all ready expended to increase the temperature of the air refrigerant system in a way which allows for extremes of temperature without multiple turbines or an excessive amount of heating elements, thus saving energy.

With regards to claim 2, Okuda discloses: wherein said compressing mechanism is composed of a single compressor (22).

With regards to claim 4, Okuda fails to disclose: a second heating unit which heats an object by said air refrigerant flowing on a subsequent stage side of said heat recovery unit and on a prior stage side of the heat exchanger. Nonetheless it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda to include multiple heating units, as an obvious duplication of parts to achieve the expected results of heating more spaces.

With regards to claim 5, Okuda discloses: An air refrigerant type freezing and heating apparatus comprising: a compressing mechanism (22) which compresses an air refrigerant; a heating unit (23) which heats a first object (warm room, 11) by said air refrigerant outputted from said compressing mechanism; a heat exchanger (24) which cools said air refrigerant outputted from said heating unit; a turbine (25) which expands said air refrigerant outputted from said heat exchanger; and a cooler (cold formation means, pg. 3, paragraph 7, line 2-3) which cools a second object (cold room, 12) different from said first object by said air refrigerant outputted from said turbine.

Okuda fails to disclose: a heater which heats said air refrigerant flowing in said heating unit. La Fleur teaches using a heater (44) to increase the temperature of gases in a compression expansion system.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda by the device of La Fleur to include a heater to bring the gasses to greater temperatures because it allows for extremes of temperature that can be difficult to reach with an air refrigerant system. Such extremes of temperature might be desirable, for example to provide heat treatments in areas where the use of conventional heat pumps or furnaces is not advisable.

With regards to claim 6, Okuda in view of La Fleur fail to disclose: the use of a heater which is an oven. Nonetheless it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda in view of La Fleur such that the heating device for the air refrigerant system is an oven,

because ovens are a common, easily obtainable piece of machinery which could easily be adapted to this system, while still being multifunctional.

4. Claims 8, 9, 10, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuda in view of Ishii (JP 2003-083634) further in view of L Fleur.

With regards to claim 10, Okuda discloses: An air refrigerant type cooling and heating system comprising: an air refrigerant type freezing and heating apparatus, which includes: a compressing mechanism (22) which compresses an air refrigerant; a heating unit (23) which heats a first object (warm room, 11) by said air refrigerant outputted from said compressing mechanism; a heat exchanger (24) which cools said air refrigerant outputted from said heating unit; a turbine (25) which expands said air refrigerant outputted from said heat exchanger; and a cooler (cold formation means, pg. 3, paragraph 7, line 2-3) which cools a second object (cold room, 12) different from said first object by said air refrigerant outputted from said turbine.

Okuda fails to disclose: a regenerator which is filled with an absorbent absorbing a refrigerant different from the air refrigerant, heats and evaporates said refrigerant mixed in said absorbent by using said air refrigerant outputted from said compressing mechanism; a condenser which condenses said refrigerant evaporated by said regenerator; an evaporator which evaporates said refrigerant condensed by said condenser and cools a third object by heat of evaporation; and an absorber which allows said absorbent outputted from said regenerator to absorb said refrigerant

evaporated by said evaporator and outputs said absorbent to said regenerator; and a heat recovery unit which recovers heat of said air refrigerant outputted from said heating unit and heats said air refrigerant flowing between said compressing mechanism and said heating unit.

Ishii teaches: a regenerator which is filled with an absorbent absorbing a refrigerant different from the air refrigerant (pg. 3, paragraph 8), heats and evaporates said refrigerant mixed in said absorbent by using said air refrigerant outputted from said compressing mechanism (pg. 4, paragraph 13); a condenser (22) which condenses said refrigerant evaporated by said regenerator; an evaporator (24) which evaporates said refrigerant condensed by said condenser and cools a third object by heat of evaporation; and an absorber which allows said absorbent outputted from said regenerator to absorb said refrigerant evaporated by said evaporator and outputs said absorbent to said regenerator (pg. 3, paragraph 8).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda by the device of Ishii to include an absorption refrigeration cycle running in parallel with the gas refrigeration cycle, because it would provide the energy and cost savings benefit of cooler temperatures in the cold room at a minimum of energy expenditure as compared with more conventional refrigeration cycles.

The general concept of recovering heat from a process to heat up an incoming stream falls within the realm of common knowledge as an obvious mechanical expedient, and is well known in the art as illustrated by La Fleur, which discloses

recovering heat from a cycle to increase the heat of steam entering a turbine (hot regenerator 42).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda to include a heat recovery unit to artificially raise the temperature of the warm room by recycling heat, because it improves the process by recovering a portion of the energy all ready expended to increase the temperature of the air refrigerant system in a way which allows for extremes of temperature without multiple turbines or an excessive amount of heating elements, thus saving energy.

With regards to claim 8, Okuda discloses: wherein the compressing mechanism is a compressor which rotates coaxially with said turbine, said air refrigerant taken in from said cooler is supplied to a low-temperature side flow passage of said heat exchanger, and said air refrigerant outputted from said low-temperature side flow passage is directly supplied to said compressor (see fig. 3).

With regards to claim 9, Okuda discloses: wherein said compressing mechanism is composed of a single compressor (22).

With regards to claim 11, Okuda fails to disclose: a second heating unit which heats an object by said air refrigerant flowing on a subsequent stage side of said heat recovery unit and on a prior stage side of the heat exchanger. Nonetheless it would

have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda to include multiple heating units, as an obvious duplication of parts to achieve the expected results of heating more spaces.

With regards to claim 12, Okuda discloses: An air refrigerant type cooling and heating system comprising: an air refrigerant type freezing and heating apparatus, which includes: a compressing mechanism (22) which compresses an air refrigerant; a heating unit (23) which heats a first object (warm room, 11) by said air refrigerant outputted from said compressing mechanism; a heat exchanger (24) which cools said air refrigerant outputted from said heating unit; a turbine (25) which expands said air refrigerant outputted from said heat exchanger; and a cooler (cold formation means, pg. 3, paragraph 7, line 2-3) which cools a second object (cold room, 12) different from said first object by said air refrigerant outputted from said turbine.

Okuda fails to disclose: a regenerator which is filled with an absorbent absorbing a refrigerant different from the air refrigerant, heats and evaporates said refrigerant mixed in said absorbent by using said air refrigerant outputted from said compressing mechanism; a condenser which condenses said refrigerant evaporated by said regenerator; an evaporator which evaporates said refrigerant condensed by said condenser and cools a third object by heat of evaporation; an absorber which allows said absorbent outputted from said regenerator to absorb said refrigerant evaporated by said evaporator and outputs said absorbent to said regenerator; and a heater which heats said air refrigerant flowing in said heating unit.

Ishii teaches: a regenerator which is filled with an absorbent absorbing a refrigerant different from the air refrigerant (pg. 3, paragraph 8), heats and evaporates said refrigerant mixed in said absorbent by using said air refrigerant outputted from said compressing mechanism pg. 4, paragraph 13); a condenser (22) which condenses said refrigerant evaporated by said regenerator; an evaporator (24) which evaporates said refrigerant condensed by said condenser and cools a third object by heat of evaporation; an absorber which allows said absorbent outputted from said regenerator to absorb said refrigerant evaporated by said evaporator and outputs said absorbent to said regenerator (pg. 3, paragraph 8).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda by the device of Ishii to include an absorption refrigeration cycle running in parallel with the gas refrigeration cycle, because it would help the refrigeration cycle to achieve the extremes of temperature that can be difficult to reach with an air refrigerant system. Such extremes of temperature might be desirable, for example to provide cold treatments in areas where the use of conventional heat pumps or refrigeration units are not advisable.

La Fleur teaches using a heater (44) to increase the temperature of gases in a compression expansion system.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda by the device of La Fleur to include a heater to bring the gasses to greater temperatures because it allows for extremes of temperature that can be difficult to reach with an air refrigerant system. Such extremes

of temperature might be desirable, for example to provide heat treatments in areas where the use of conventional heat pumps or furnaces is not advisable.

With regards to claim 13, Okuda in view of Ishii further in view of La Fleur fail to disclose: the use of a heater which is an oven. Nonetheless it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of Okuda in view of La Fleur such that the heating device for the air refrigerant system is an oven, because ovens are a common, easily obtainable piece of machinery which could easily be adapted to this system, while still being multifunctional.

***Response to Arguments***

5. Applicant's arguments with respect to claims 3, 5, 10 and 12 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHANIE MCLAREN whose telephone number is (571) 270-7127. The examiner can normally be reached on Monday - Friday 9:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules &. Cheryl Tyler can be reached on (571) 272-6681 & (571)-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SDM/

4/13/09

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744